

REMARKS

As requested by the Examiner, claims 24-27 have been canceled. Additionally, claims 34-36 have been canceled.

Claims 28-39 are rejected under 35 U.S.C. Section 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claims the subject matter which applicant regards as the invention. Specifically, claims 28-39 were asserted to be vague because closed form language “consisting of” was used with respect to a particular organic solvent used in a solvent blend with tetrafluoroethane in each of the independent claims. Further, that the dependent claims used Markush format to recited additional co-solvents that could be used together with the specific solvent of the independent claim and so were asserted to lack antecedent basis. The remaining independent claims 28, 31 and 37 have been amended to remove the closed “consisting of” language and so now provide antecedent basis to their respective dependent claims. Reconsideration and withdrawal of the Section 112 rejection is respectfully requested.

Claims 28-39 are rejected under the judicially created doctrine of obviousness-type double patenting over a co-owned issued patent and published application. Applicant respectfully disagrees with the position of the Examiner but will consider entering a terminal disclaimer to overcome this rejection if an agreement as to allowable subject matter is otherwise reached.

Claims 28-39 are rejected under 35 U.S.C. Section 103(a) as being unpatentable over Powell et al. and Kimura. This ground of rejection is respectfully traversed in light of the foregoing amendments and these remarks.

The differences between the Powell et al. reference and the present invention are perhaps best appreciated by a consideration of the differences in the products produced by the two methods - relatively volatile flavored and aromatic compounds by the Powell et al. method and non-volatile, flavorless and odorless antioxidant compounds by the methods of the present invention. Powell et al. teaches the extraction of relatively volatile flavored and aromatic oils using TFE and a co-solvent with a low boiling point. This is in direct contrast to the present invention as defined in the amended claims wherein a first organic component is isolated that has antioxidant properties. The antioxidant compounds

extracted by the process of the present invention have no noticeable fragrance. Indeed, it is the fragrance and taste of prior art extracts of Lamiaceae species that have presented difficulties in their use as antioxidant compounds in the past, particularly for protecting foods against oxidation, because such prior art extracts usually included some of the volatile aromatic compounds for which these plants are well known. These flavored and aromatic compounds impart a flavor and fragrance that would be unacceptable in most food applications. It is precisely these aromatic compounds that are extracted by the method taught in the Powell et al. reference. Using tetrafluoroethane and a co-solvent which boiled off with the TFE at room temperature and pressure, the Powell et al. reference extracted particularly pure and clean aromatic compounds from plant material.

Powell et al. teaches only the use of co-solvents having a boiling point below 20°C. It teaches nothing whatsoever about the use of co-solvents with higher boiling points. While the specification does say that it is preferred to use solvents having a boiling point below 20°C, none of the solvents recited in the specification have a boiling point higher than 20°C. Moreover, as is taught in the present specification, the use of co-solvents having a boiling point above 22°C extracts the desired antioxidant compounds of the present invention and separates them from the aromatic compounds desired in the Powell et al. reference as evidenced by the teaching in the specification of the low level of fragrance and taste in the extracts of the present invention (see, for example, page 4, lines 20-23). Prior to the filing of the present application, the inventors experimented with lower boiling point compounds as taught in the Powell et al. reference and did not succeed in extracting the antioxidant components.

This difference in the compounds extracted by the two methods may be explained by the difference in the volatility of the extracted compounds. The fragrances or aromatic compounds extracted by the Powell et al. method are relatively volatile compounds; a fragrance must be volatile for it to be smelled. The carnosic acid extracted by the present method, on the other hand, is a powder at room temperature. Since there is a direct relationship between volatility or boiling point and polarity, that is, compounds with lower polarity have, in general, a lower boiling point, the aromatic compounds extracted by the Powell et al. method are less polar than the antioxidant compounds extracted by the method of the present invention. It is also well known that compounds of low polarity are

not generally soluble in compounds of high polarity, and vice versa. The Powell et al. method uses co-solvents of low polarity and low boiling point to extract compounds of low polarity and low boiling point/high volatility; the method of the present invention uses co-solvents of higher polarity and higher boiling point to extract compounds of higher polarity and higher boiling point/lower volatility. The table below is a summary of a comparison of the two processes.

Summary Comparison of Prior Art vs. Present Invention

	Powell et al.	Present Invention
Material to be extracted	Plant material	Plant material
TFE	Yes	Yes
Co-solvent - polarity - boiling point	Low < 20°C	High >22°C
Removal of co-solvent	Evaporates off at room temperature and pressure together with TFE	By evaporation at elevated temperature and <u>not</u> with TFE
Product of the process - polarity - volatility - fragrance - flavor	Low High Yes Yes	High Low No No

Reconsideration and withdrawal of the Section 103(a) rejection is respectfully requested.

The Kimura reference is asserted to teach a method of effectively obtaining polar antioxidant compounds from botanical materials using a mixture of polar and non-polar solvents. There are a great many differences between the Kimura method and that of the present invention. One important difference fatal to the applicability of the Kimura reference to the present invention is that Kimura teaches that the active antioxidant compounds that it extracts are present in the non-polar phase whereas the active antioxidant compounds of the present invention are present in the polar phase. At column 5, lines 64-68 and column 6, lines 1-7, Kimura reads:

“Since both the active fractions [recall that Kimura extracts antioxidant and antibacterial compounds] are thus present in the non-polar solvent phase, an active

composition (containing both the active fractions) may be efficiently recovered simply by collecting the non-polar solvent phase.

After being separated from the water/polar phase, the non-polar phase may be subjected to distillation to remove the non-polar solvent, thereby collecting a solid matter containing the highly oil-soluble active fraction and the substantially oil-insoluble active fraction in admixture, which is easy to use as a solid preservative.”

In the present method, TFE is the non-polar solvent and it is combined with one or more polar co-solvents. After the solvent blend is contacted with the botanical material to extract the first and second organic components, the non-polar TFE is allowed to evaporate off, leaving the active antioxidant components in the polar phase. Kimura teaches nothing with respect to a method wherein the antioxidant compounds are recovered in the polar phase of a co-solvent system. Reconsideration and withdrawal of the rejection under 103(a) is respectfully requested.

The application has been amended to further distinguish the application over the prior art, and to more particularly point out and distinctly claim the subject matter which Applicant regards as the invention so as to place the application, as a whole, into a prima facie condition for allowance. Great care has been taken to avoid the introduction of new subject matter into the application as a result of the foregoing modifications.

Accordingly, the purpose of the claimed invention is not taught nor suggested by the cited references, nor is there any suggestion or teaching which would lead one skilled in the relevant art to combine the references in a manner which would meet the purpose of the claimed invention. Because the cited references, whether considered alone, or in combination with one another, do not teach nor suggest the purpose of the claimed invention, Applicant respectfully submits that the claimed invention, as amended, patentably distinguishes over the prior art, including the art cited merely of record.

Based on the foregoing, Applicant respectfully submits that its claims 28-33 and 37-39 are in condition for allowance at this time, patentably distinguishing over the cited prior art. Accordingly, reconsideration of the application and passage to allowance are respectfully solicited.

The Examiner is respectfully urged to call the undersigned attorney at (515) 288-2500 to discuss the claims in an effort to reach a mutual agreement with respect to claim

limitations in the present application which will be effective to define the patentable subject matter if the present claims are not deemed to be adequate for this purpose.

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Respectfully submitted,



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